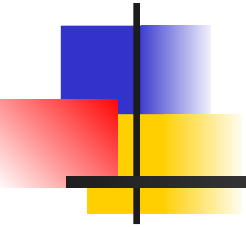
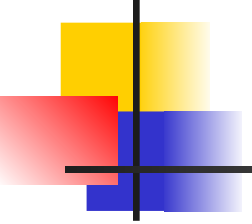


Water Supply Economic Analysis



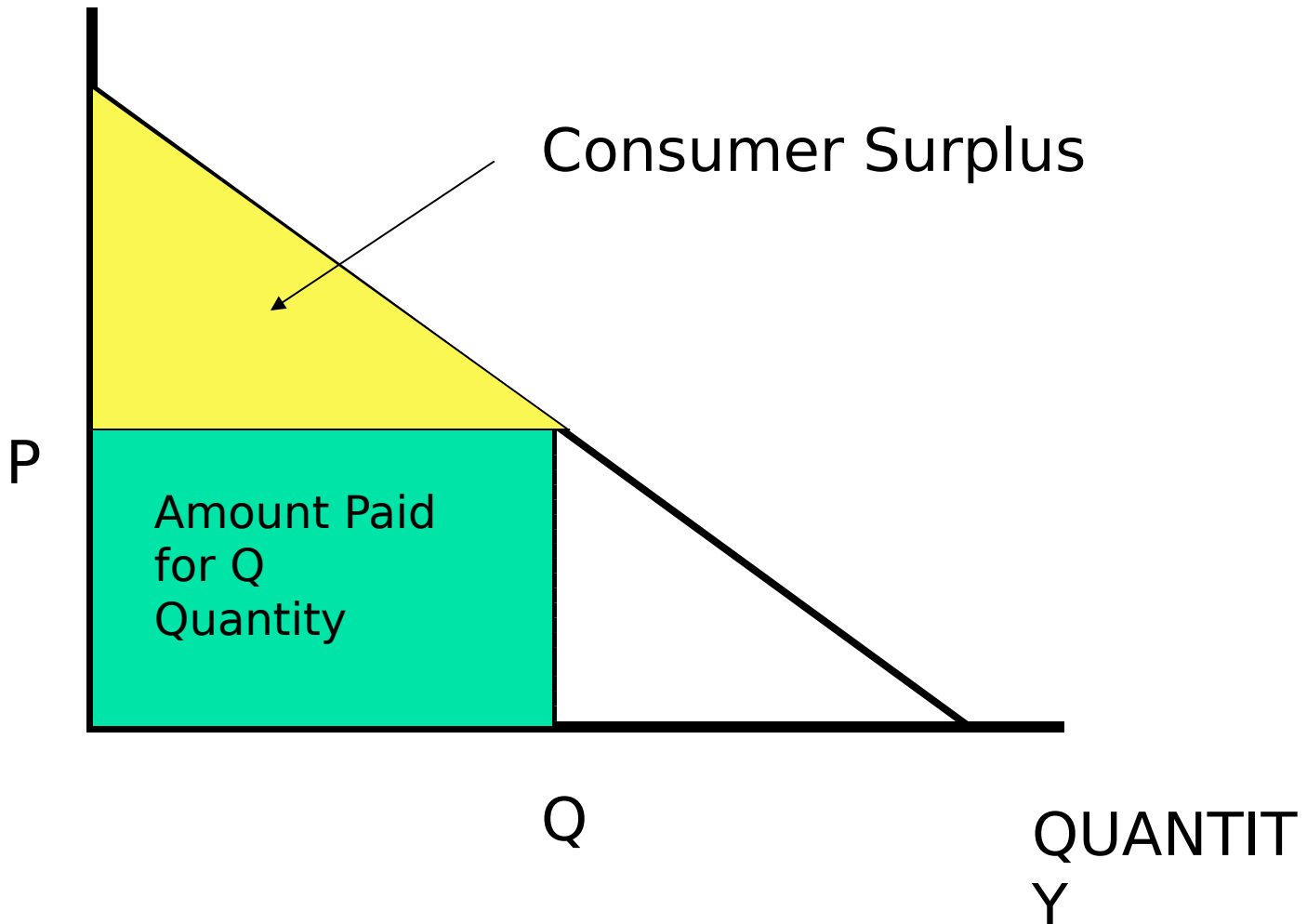


Water Supply Economic Analysis

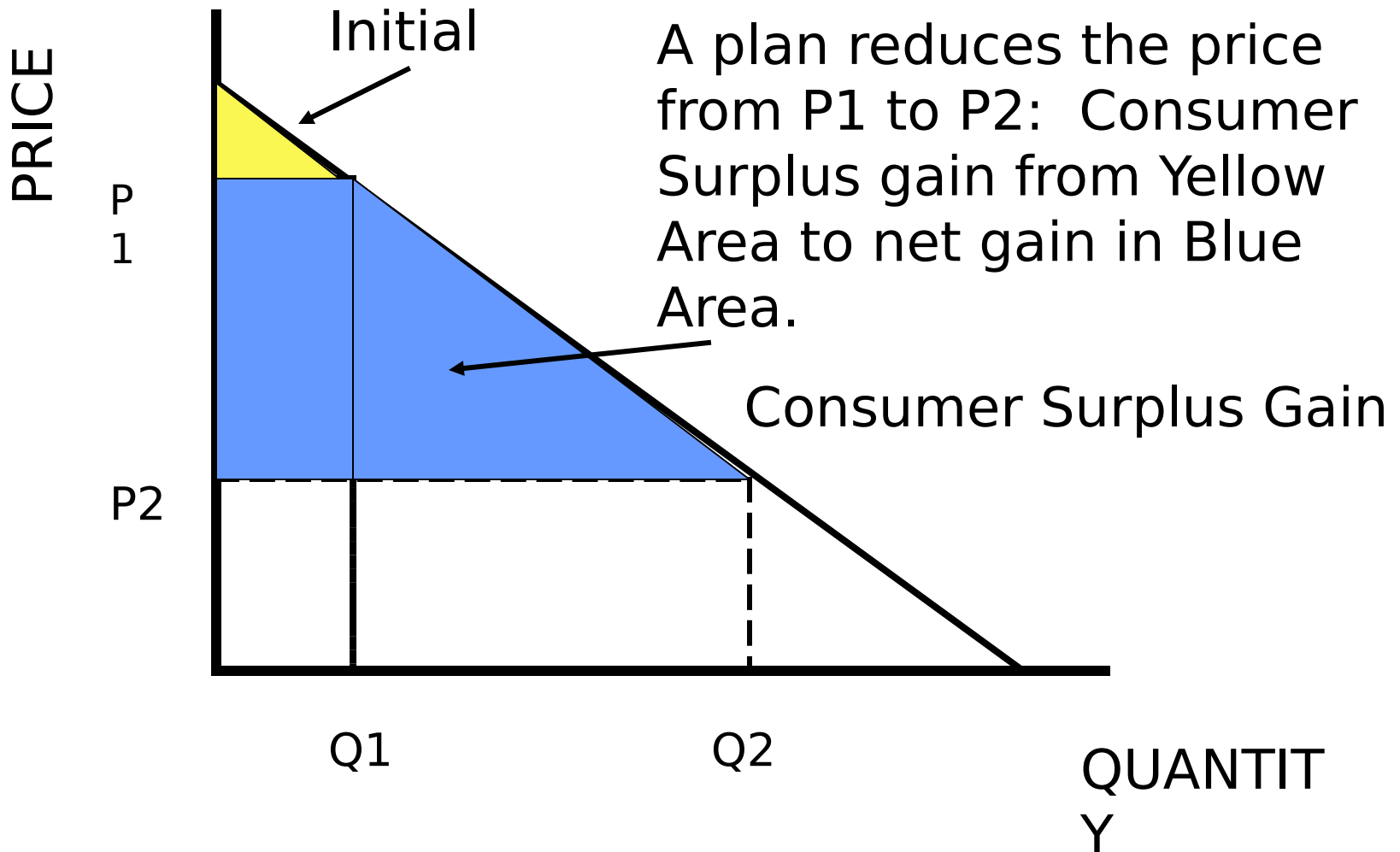
- Objective: The student will be able to describe the methodology for computing NED benefits for Water Supply projects.

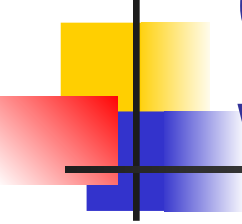
Consumer Surplus

PRICE



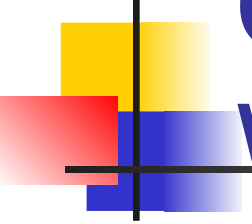
Example of Consumer Surplus:





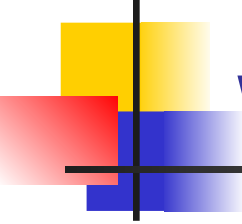
Conceptual Basis For Water Supply NED Benefits

- **From the P&G:**
- Society's willingness to pay for the increase in the value of goods and services attributable to the water supply. **Where the price of water reflects its marginal cost**, use that price to calculate willingness to pay.



Conceptual Basis For Water Supply NED Benefits

- Water Supply **is normally priced on the average**, not on the margin. So, must use one of the other accepted methods described in P&G.

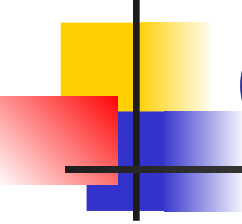


Willingness To Pay

Benefit Estimation

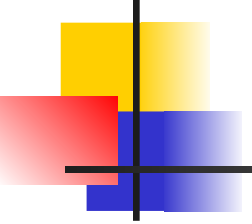
Approaches

- Actual or simulated market price
- Change in net income
- Cost of the most likely alternative
- Administratively established values



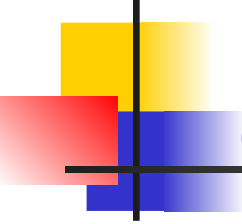
Conceptual Basis For NED

- **From P&G:**
- In the absence of such direct measures of marginal willingness to pay, the benefits from a water supply plan are measured instead by the resource cost of the alternative **most likely to be implemented in the absence of that plan.**



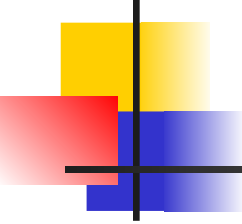
Benefit Analysis - Steps

- **Step 1** - Identify the Study Area
- **Step 2** - Estimate Future M&I Water Supplies
- **Step 3** - Project Future M&I Water Use
- **Step 4** - Identify the Deficit Between Future Water Supplies and Use



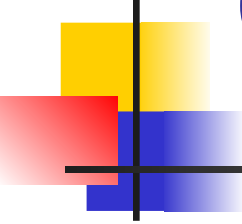
Benefit Analysis – Steps (Cont.)

- **Step 5** - Identify Alternatives Without Federal Plan
- **Step 6** - Rank and Display the Alternative Plans Based on Least Cost Analysis
- **Step 7** - Identify the Most Likely Alternative
- **Step 8** - Compute M&I Water Supply Annualized Benefits



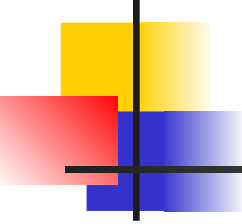
Water Supply - Reallocations

- Reallocate storage at existing reservoirs
- Key element is definition of costs of storage to new water supply user

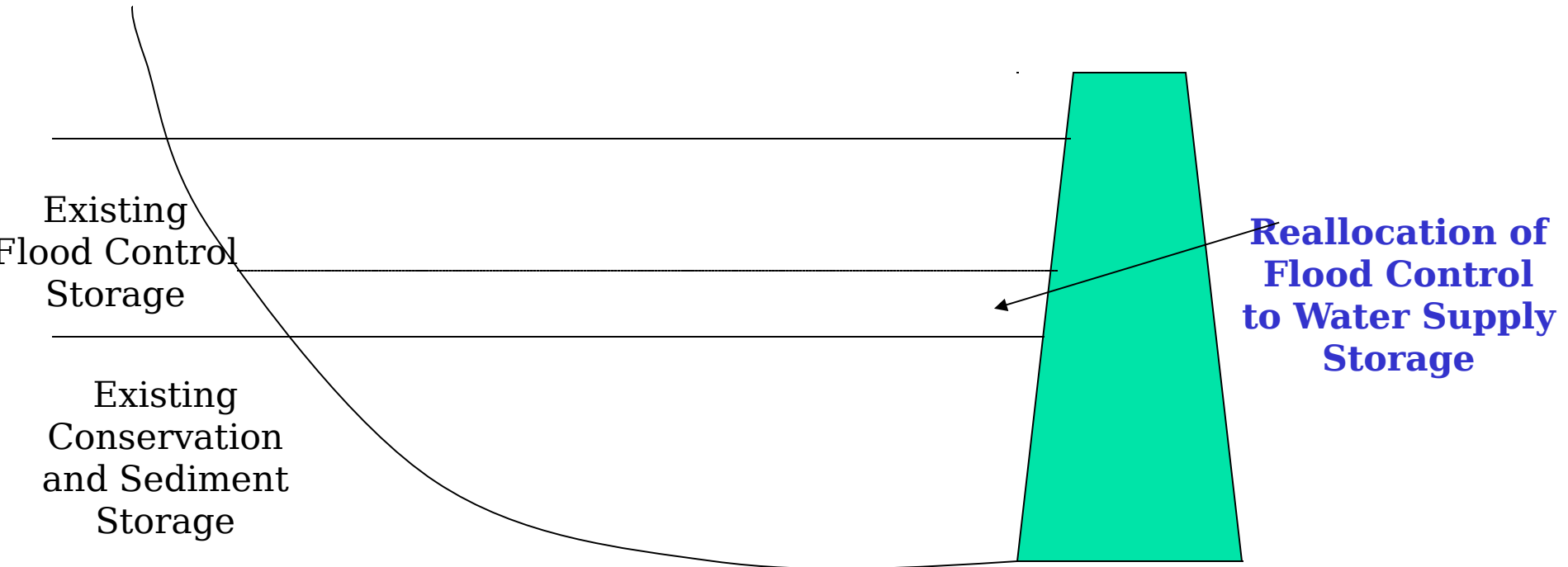


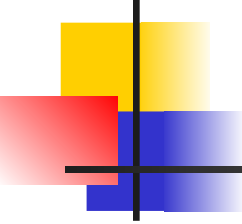
Opportunities for Reallocation

- Reallocation of Flood Control Storage
- Reallocation of Conservation Storage
 - Water Quality
 - Hydropower
 - Other
- Reallocation of Sediment Pool

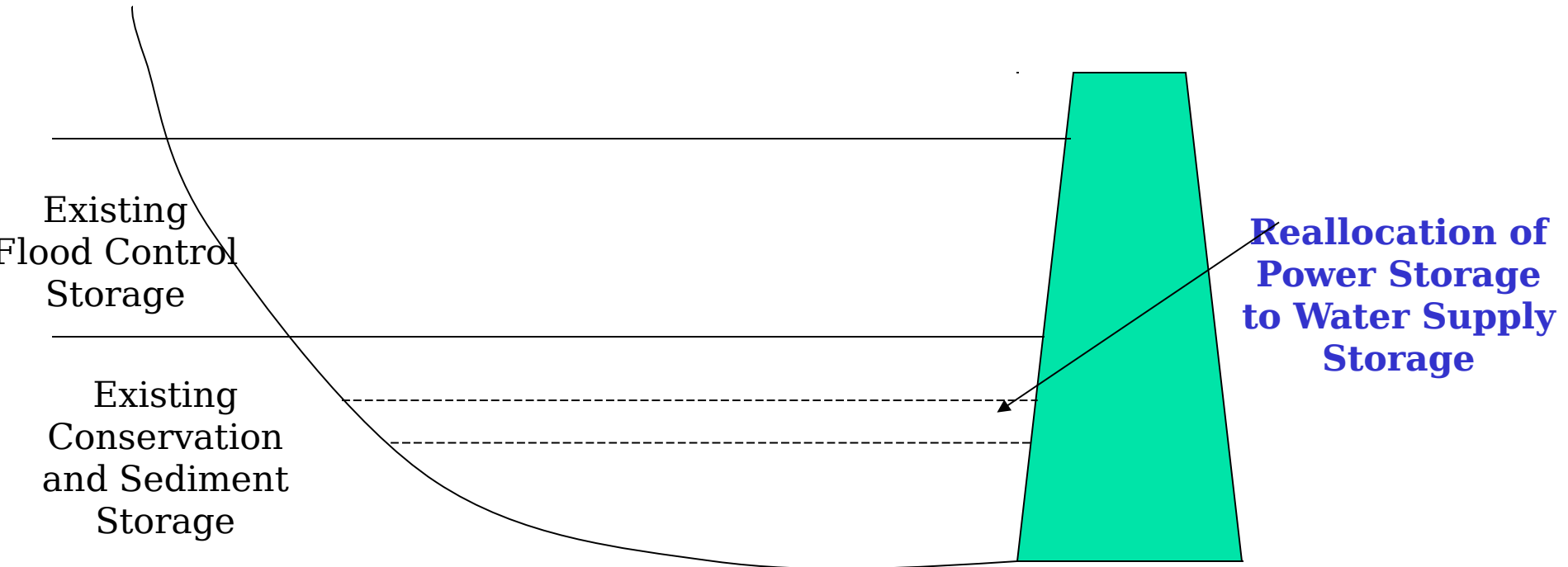


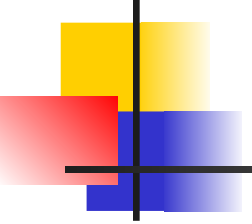
Reallocation: Example 1





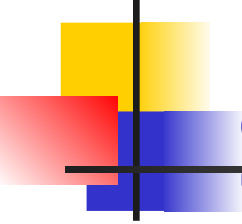
Reallocation - Example 2





Reallocations: Economic Evaluation Concepts

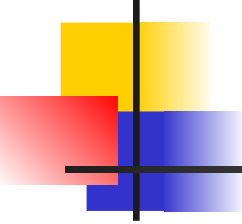
- Identify and measure benefits and costs using “with and without” principle
- Benefit is most-likely, least costly alternative
- Apply opportunity cost concept in the with project (e.g. what is foregone?)



Price of Reallocated Storage

Highest of:

1. Benefits foregone
 - opportunity costs from economic evaluation
2. Revenues foregone
 - revenues to Treasury lost due to reduced power production (current power rates)
3. Replacement costs
 - replacement cost of flood control
 - benefits foregone for hydropower
4. Updated cost of storage in the Federal reservoir



Price of Reallocated Storage (cont.)

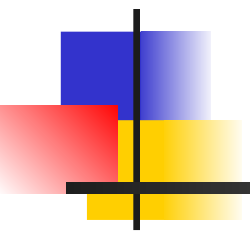
4. Updated Cost of Storage =

$$(TC - SP) \quad X \quad \frac{\text{Storage reallocated (ac-ft)}}{\text{Total usable storage space (ac-ft)}}$$

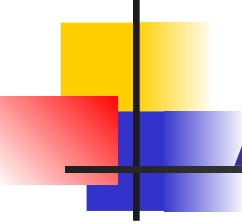
TC = total costs of construction updated using Civil Works

Construction Cost Index System (CWCCIS) and ENR

SP = specific costs = costs of identifiable project features for a specific purpose updated using CWCCIS and ENR



Summary



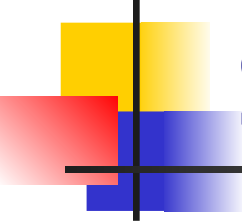
Water Supply Economic Analysis

■ **Inputs:**

- Water needs
- Cost of most likely alternative
- For reallocations:
Need the effects
on existing project
purposes

■ **Outputs:**

- Net NED benefits
- Benefit to cost
ratio
- Price of water
supply storage
(\$/acre-foot)
- Info for water
supply contract



Summary

- Benefits based on the most likely alternative
- Reallocation studies are the most common Corps water supply study
- Price of reallocated study based either on benefits foregone or updated price of storage